UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,637	05/27/2005	Josephus Arnoldus Kahlman	NL021265	2471

24737 7590 03/18/2009
PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
JUNG, UNSU	

ART UNIT	PAPER NUMBER
1641	

MAIL DATE	DELIVERY MODE
03/18/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/536,637
Filing Date: May 27, 2005
Appellant(s): KAHLMAN ET AL.

William S. Francos
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on January 26, 2009 appealing from the Office action mailed on September 3, 2008. It is noted that the page 1 of the appeal

brief correctly identifies the application number of the instant application as 10/536,637. However, the application number indicated in the heading (11/142,423) is incorrect.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

This appeal involves claims 1-8.

Claims 9-13 have been previously canceled.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,552,274	OYAMA et al.	9-1996
5,926,301	HIRT	7-1999
6,084,503	RUILE et al.	7-2000
6,592,820	HARDMAN et al.	11-1998
WO 00/66781	ISHIKAWA et al.	11-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 4, 5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) and Ishikawa et al. (WO 00/66781, Nov. 9, 2000).

Oyama et al. teaches a device (quartz crystal microbalance, QCM) comprising a sensor element (having biomolecular binding sites for a biomolecule, see entire document, particularly Abstract and Fig. 1) connected to an external oscillating circuit adapted to resonate with the frequency inherent in the quartz plates (column 1, line 64-column 2, line 3). This frequency is related to the mass of quartz as well as the mass, viscosity and viscoelasticity of the electrodes, which are in contact with the quartz. Generally, the variation of resonant frequency (f) and that of mass of a substance in contact with quartz are correlated. This device provide for both DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency (column 2, lines 43-57).

With respect to claims 4 and 5, Oyama et al. teaches a sensor element, which forms a part of a voltage (V) or current (I) supplying circuit (oscillating circuit), coupled to the resonance frequency circuit (column 1, line 64-column 2, line 3), wherein the V/I of the supplying circuit is dependent on the physical property of the sensor element, and the resonant frequency (f) of the resonance circuit is dependent on the V/I (column 6, line 60-column 7, line 19).

With respect to claim 8, Oyama et al. teaches a sensor element formed on the surface of an on-chip SAW resonator can be used for detection of DNA (column 5, line 63-column 6, line 7).

However, Oyama et al. fails to teach a device comprising a remote power transmission element for receiving a resonant frequency. Oyama et al. further fails to teach a device, wherein a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit is separate from the remote power transmission element, which comprises a coil for receiving RF power whereby the remote power transmission element is arranged for receiving an RF frequency different from the resonant frequency.

With respect to claim 1, Ruile et al. teaches a radio-interrogated surface wave technology sensor (see entire document, particularly Abstract), wherein a radiofrequency (RF) transmitter and receiver having transmission and reception antennas, with an electronic evaluation device (circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit), which is used for qualitative/quantitative evaluation of a change in the response

of the surface-wave sensor and for receiving power transmitted from a remote RF transmitter (column 2, lines 30-50).

With respect to claims 1 and 3, Ishikawa et al. teaches a wireless power transmitting element (external control station) for transmitting power to another wireless power transmitting element in a circuit provided in a biosensor device (see entire document, particularly p15, lines 3-17 and Fig. 11). The power is transported either by radiofrequency (RF) radiation or by magnetic coupling between the control system antenna/coil and the biosensor antenna/coil (p15, lines 5-17). Using the RF transmissions, the biosensor can be interrogated individually, or as groups (p14, line 27-p15, line 1).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. with a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit as taught by Ruile et al. in order to provide a remote power source and interrogation device for DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency.

The advantage of transmitting and receiving detection signals (resonance frequency of the sensor element) remotely provides the motivation to employ the remote RF transmitter and receiver device of Ruile et al. in the device of Oyama et al. with a reasonable expectation of success as the remote RF transmitter and

receiver device of Ruile et al. can be used in devices comprising different types of sensor elements including a SAW resonator, which is used in biosensor applications to identify or quantitatively measure chemical/biological substances.

In addition, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to include in the system of Oyama et al. in view of Ruile et al. with a remote power transmitting element comprising a coil as taught by Ishikawa et al. in order to wirelessly transmit power to a biosensor device to interrogate individual or groups of biosensors.

The advantage of transporting wireless power in a biosensor device with ability to interrogate individual or groups of biosensors provides motivation to combine teachings of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a reasonable expectation of success since wireless power allows elimination of need for connecting each biosensor with power devices for conducting assays on the biosensor.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) and Ishikawa et al. (WO 00/66781, Nov. 9, 2000) as applied to claim 1 above, and further in view of Hirt (U.S. Patent No. 5,926,301, July 20, 1999).

Oyama et al. in view of Ruile et al. and Ishikawa et al. teaches a device as set forth above. However, Oyama et al. in view of Ruile et al. and Ishikawa et al.

fails to teach a device, wherein the remote power transmission element comprises a photodiode.

Hirt teaches remote devices such as light emitting diodes and photodiodes, which are usually smaller than radio-frequency antennae (see entire document, particularly column 1, lines 26-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a photodiode as a remote power transmission element as taught by Hirt in order to use a small remote power transmission element to be incorporated in the device of Oyama et al. in view of Ruile et al. and Ishikawa et al. The advantage of employing remote power transmission element, which is smaller, provides the motivation to combine teachings of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a reasonable expectation of success as smaller remote power transmission elements of Hirt would be advantageous for devices of Oyama et al. having small dimensions (minute size, Example 5).

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) and Ishikawa et al. (WO 00/66781, Nov. 9, 2000) as applied to claim 1 above, and further in view of Hardman et al. (U.S. Patent No. 6,592,820, Filed Nov. 5, 1998).

Oyama et al. in view of Ruile et al. and Ishikawa et al. teaches a device as set forth above. Ruile et al. further teaches that variety of sensor elements (sensitive elements) can be employed with the remote RF transmitter and receiver including magnetoresistors (column 2, lines 56-63). However, Oyama et al. in view of Ruile et al. and Ishikawa et al. fails to teach a device, wherein the sensor element (71) is magnetoresistive element provided in a bridge configuration.

With respect to claims 6 and 7, Hardman et al. teaches that a conventional biochemical assay may include a detection of microscopic paramagnetic particles (PMPs) bound to a GMR sensor by specific intermolecular recognition bonds (see entire document, particularly column 1, lines 34-37). PMPs are detected as a difference in the resistance of a GMR sensor having a bound PMP compared to a reference GMR sensor having no bound PMP (column 1, lines 37-40). A plurality of sensors is arranged in an array coupled to a differential amplifier (column 2, lines 32-34). Each addressed cell is coupled in a bridge circuit to the differential amplifier, which provides a signal, which is in the form of frequency and conveys indicia of the resistance of each sensor. For proper operation, GMR elements require a current passing through the respective elements (column 17, lines 20-24).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a GMR sensor comprising GMR elements coupled

to a bridge circuit as taught by Hardman et al. in order to provide GMR sensor with power via a wireless power transmitter for conducting biochemical assays using microscopic paramagnetic particles.

Further, Oyama et al. in view of Ruile et al. and Ishikawa et al. meets the limitations of claims 6 and 7 except that it employs a SAW resonator rather than a magnetoresistive element (resistive elements provided in a bridge configuration) in order to detect an analyte in a sample using biochemical/binding assays. However, because these two elements were art-recognized equivalents at the time of the invention in the remote power transmission applications where it is immaterial whether a SAW resonator or a magnetoresistive element is used for detecting an analyte in a sample using biochemical/binding assays, one of ordinary skill would have found it obvious to substitute a magnetoresistive element (resistive elements provided in a bridge configuration) for the SAW resonator of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a reasonable expectation of success.

(10) Response to Argument

Appellant's arguments in the brief on appeal have been fully considered but they are not persuasive essentially for the reasons of record.

1) Claims 1, 3, 4, 5, and 8 are Patentable over the Applied Prior Art

Claim 1

Regarding claim 1, Appellant's arguments in the brief on appeal have been fully considered but they are not persuasive essentially for the reasons of record.

Specifically, appellant asserts that the rejection under Oyama et al. in view of Ruile et al. and Ishikawa et al. was based on extraction of elements of claim 1 from the prior art references in a manner that requires the use of claim 1 as a template for its reconstruction. However, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In this case, the knowledge of employing a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit in surface acoustic sensor devices was well known in the art. Such application of remote transmitter and receiver

arrangement has been used in variety of sensor applications including toll systems, piezoelectric sensors, temperature sensors, and chemical sensors as taught by Ruile et al. (column 1, lines 51-column 2, line 16). Therefore, the knowledge of employing a remote RF transmitter and receiver of Ruile et al. having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit in surface acoustic sensor devices such as the one taught by Oyama et al. would have been within the level of one of ordinary skill in the art at the time of the invention since the application of remote transmitter and receiver arrangement in variety of sensor applications is known in the art.

Similarly, Ishikawa et al. teaches a wireless power transmitting element (external control station) for transmitting power to another wireless power transmitting element in a circuit provided in a biosensor device (p15, lines 3-17 and Fig. 11) as set forth in the Final Office Action dated September 3, 2008 (see item 7). The power is transported either by radiofrequency (RF) radiation or by magnetic coupling between the control system antenna/coil and the biosensor antenna/coil (p15, lines 5-17). Using the RF transmissions, the biosensor can be interrogated individually, or as groups (p14, line 27-p15, line 1). Therefore, the knowledge of employing a remote power transmitting element of Ishikawa et al. in the system of Oyama et al. would have been within the level of

one of ordinary skill in the art at the time of the invention since the application of remote/wireless power transmission in a biosensor device is known in the art.

In response to appellant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In this case, Oyama et al. teaches a device (quartz crystal microbalance, QCM) comprising a sensor element (having biomolecular binding sites for a biomolecule, see entire document, particularly Abstract and Fig. 1) connected to an external oscillating circuit adapted to resonate with the frequency inherent in the quartz plates (column 1, line 64-column 2, line 3) as set forth in the Final Office Action dated September 3, 2008 (see item 7). However, Oyama et al. fails to teach a device comprising a remote power transmission element for receiving a resonant frequency. Oyama et al. further fails to teach a device, wherein a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit is separate from the remote power transmission

element, which comprises a coil for receiving RF power whereby the remote power transmission element is arranged for receiving an RF frequency different from the resonant frequency. Further, it is noted that the teachings of Oyama et al. reference have not been traversed.

As set forth above, Ruile et al. teaches a radio-interrogated surface wave technology sensor (see entire document, particularly Abstract), wherein a radiofrequency (RF) transmitter and receiver having transmission and reception antennas, with an electronic evaluation device (circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit), which is used for qualitative/quantitative evaluation of a change in the response of the surface-wave sensor and for receiving power transmitted from a remote RF transmitter (column 2, lines 30-50) and Ishikawa et al. teaches a wireless power transmitting element (external control station) for transmitting power to another wireless power transmitting element in a circuit provided in a biosensor device (see entire document, particularly p15, lines 3-17 and Fig. 11). The power is transported either by radiofrequency (RF) radiation or by magnetic coupling between the control system antenna/coil and the biosensor antenna/coil (p15, lines 5-17). Using the RF transmissions, the biosensor can be interrogated individually, or as groups (p14, line 27-p15, line 1).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. with a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit as taught by Ruile et al. in order to provide a remote power source and interrogation device for DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency.

The advantage of transmitting and receiving detection signals (resonance frequency of the sensor element) remotely provides the motivation to employ the remote RF transmitter and receiver device of Ruile et al. in the device of Oyama et al. with a reasonable expectation of success as the remote RF transmitter and receiver device of Ruile et al. can be used in devices comprising different types of sensor elements including a SAW resonator, which is used in biosensor applications to identify or quantitatively measure chemical/biological substances.

In addition, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to include in the system of Oyama et al., in view of Ruile et al., a remote power transmitting element comprising a coil as taught by Ishikawa et al. in order to

wirelessly transmit power to a biosensor device to interrogate individual or groups of biosensors.

The advantage of transporting wireless power in a biosensor device with ability to interrogate individual or groups of biosensors provides motivation to combine teachings of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a reasonable expectation of success since wireless power allows elimination of need for connecting each biosensor with power devices for conducting assays on the biosensor.

Given the examination guidelines for determining obviousness under 35 U.S.C. 103 in view of the Supreme Court decision in *KSR International Co. v. Teleflex Inc.* 82 USPQ2d 1385 (2007) and the Examination Guidelines set forth in the Federal Register (Vol. 72, No. 195, October 10, 2007). According to MPEP § 2143, the following exemplary rationales may support a conclusion of obviousness under 35 U.S.C. 103(a):

A) Combining prior art elements according to known methods to yield predictable results: The rationale to support a conclusion that the claims would have been obvious is that all the claimed elements (e.g., a device having biomolecular binding sites for a biomolecule, a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit, and a remote power

transmitting element comprising a coil) were known in the prior art and one skilled in the art could have arrived at the claimed invention by using known methods (employing a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit and a remote power transmitting element comprising a coil in a biosensor device) with no change in their respective functions and the combination would have yielded nothing more than predictable results of providing wireless power to the biosensor device and remotely detecting signals being produced by the sensor elements.

B) Use of known technique to improve similar products in the same way: The rationale to support a conclusion that the claims would have been obvious is that a method of employing a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit, and a remote power transmitting element comprising a coil in a biosensor device made part of ordinary capabilities of one skilled in the art based upon the teachings of the prior art. One of ordinary skill in the art would have been capable of applying a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit and a remote power

transmitting element comprising a coil to a biosensor device since such combination would have yielded predictable results of providing wireless power to the biosensor device and remotely detecting signals being produced by the sensor elements.

C) Applying a known technique to a known product ready for improvement to yield predictable results: The rationale to support a conclusion that the claims would have been obvious is that a particular known technique (employing a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit and a remote power transmitting element comprising a coil in a biosensor device) was recognized as part of the ordinary capabilities of one skilled in the art. One of ordinary skill in the art would have been capable of applying this known technique (a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit and a remote power transmitting element comprising a coil) to a known device (biosensor device) that was ready for improvement (wireless/remote power and detection means) and the results would have been predictable to one of ordinary skill in the art.

D) “Obvious to try” --- choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success: The

rationale to support a conclusion that the claim would have been obvious is that a person of ordinary skill has good reason to pursue the known options (a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit and a remote power transmitting element comprising a coil) within his or her technical grasp. This leads to the anticipated success of employing a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit and a remote power transmitting element comprising a coil in a biosensor device in order to provide wireless/remote power and detection means for the biosensor device. It is likely the product not of innovation but of ordinary skill and common sense.

E) Some teachings, suggestion, or motivation in the prior art that would have lead one of ordinary skill to modify the prior art reference to arrive at the claimed invention: Given the teachings of the prior art references (Oyama et al., Ruile et al., and Ishikawa et al.) as set forth above and in the previous Final Office Action dated September 3, 2008 (see item 7), it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. with a remote RF transmitter and receiver having transmission and

reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit as taught by Ruile et al. in order to provide a remote power source and interrogation device for DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency. The advantage of transmitting and receiving detection signals (resonance frequency of the sensor element) remotely provides the motivation to employ the remote RF transmitter and receiver device of Ruile et al. in the device of Oyama et al. with a reasonable expectation of success as the remote RF transmitter and receiver device of Ruile et al. can be used in devices comprising different types of sensor elements including a SAW resonator, which is used in biosensor applications to identify or quantitatively measure chemical/biological substances and the remote transmitter and receiver device allows elimination of need for connecting each biosensor with transmitter and receiver devices for detection of signals generated by the sensor elements. In addition, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to include in the system of Oyama et al. in view of Ruile et al. with a remote power transmitting element comprising a coil as taught by Ishikawa et al. in order to wirelessly transmit power to a biosensor device to interrogate individual or groups of biosensors. The advantage of transporting wireless power in a biosensor device with ability to interrogate

individual or groups of biosensors provides motivation to combine teachings of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a reasonable expectation of success since wireless power allows elimination of need for connecting each biosensor with power devices for conducting assays on the biosensor.

F) Known Work in One Field of Endeavor May Prompt Variations of It for Use in Either the Same Field or a Different One Based on Design Incentives or Other Market Forces if the Variations Are Predictable to One of Ordinary Skill in the Art: Employing a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit and a remote power transmitting element in a biosensor device was but a variation on already known methods of providing remote power and remote detection means. There was no technological advance beyond the skill shown in the prior art teachings. Using a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit and a remote power transmitting element for providing remote power and remote means for detecting signals produced by sensor elements accomplishes that goal that would have been reasonably obvious to one of ordinary skill in designing efficient means to accomplish said goals.

"The test of obviousness is not express suggestion of the claimed invention in any or all of the references but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them." See *In re Rosselet*, 146 USPQ 183, 186 (CCPA 1965).

"There is no requirement (under 35 USC 103(a)) that the prior art contain an express suggestion to combine known elements to achieve the claimed invention. Rather, the suggestion to combine may come from the prior art, as filtered through the knowledge of one skilled in the art." *Motorola, Inc. v. Interdiqital Tech. Corp.*, 43 USPQ2d 1481, 1489 (Fed. Cir. 1997).

An obviousness determination is not the result of a rigid formula disassociated from the consideration of the facts of a case. Indeed, the common sense of those skilled in the art demonstrates why some combinations would have been obvious where others would not. See *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007) ("The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.").

Given that the prior art goal was to provide remote power and remote means for detecting signals produced by sensor elements, incorporating known means such as a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF

communication of an RF signal in dependence of the resonance frequency of the resonant circuit and a remote power transmitting element comprising a coil in a biosensor would have been routine to the ordinary artisan at the time the invention was made and therefore obvious in designing efficient means to provide remote power and remote means for detecting signals produced by sensor elements.

From the teachings of the references, it was apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Ruile et al. Non-Analogous Art

In response to appellant's argument that Ruile et al. is nonanalogous art, it has been held that a prior art reference must either be in the field of appellant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the appellant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, although Ruile et al. may not specifically include a biosensor device in conjunction with the remote detection devices, Ruile et al. teaches that

radio- and remote-interrogated detection system (including a transmitter and receiver) can be used in variety of different sensor devices including toll systems, piezoelectric sensors, temperature sensors, and chemical sensors (column 1, lines 51-column 2, line 16) as set forth above. Biosensor is a specific type of chemical sensors, whose chemical substance to be detected is a biological substance. Further, radio- and remote-interrogated detection system of Ruile et al. can be used with generic sensor devices having surface-wave sensor elements (column 1, line 51-column 2, line 64 and claim 1). Given the teachings of Ruile et al., use of such remote devices including a remote transmitter and a remote receiver in variety of sensor devices is known in the art. Therefore, the knowledge of employing a remote RF transmitter and receiver of Ruile et al. having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit in surface acoustic sensor devices such as the one taught by Oyama et al. would have been within the level of one of ordinary skill in the art at the time of the invention since the application of remote transmitter and receiver arrangement in variety of sensor applications is known in the art. In view of the foregoing, Oyama et al. and Ruile et al. are in the field of surface-wave sensor elements, which is a relevant field of appellant's endeavor and reasonably pertinent to the particular problem with detecting signals generated from such sensor devices.

Basis of combination is Improper

Appellant's argument that Ruile et al. fails to reveal any disclosure of SAW resonators or the application to biosensors has been fully considered but is not found persuasive essentially for the reasons of record and response to arguments set forth above. As stated above, Ruile et al. teaches that radio- and remote-interrogated detection system (including a transmitter and receiver) can be used in variety of different sensor devices including toll systems, piezoelectric sensors, temperature sensors, and chemical sensors (column 1, lines 51-column 2, line 16) as set forth above. Biosensor is a specific type of chemical sensors, whose chemical substance to be detected is a biological substance. Further, Ruile et al. discloses use of radio- and remote-interrogated detection system in SAW (surface acoustic) resonators (column 1, lines 55-61 and column 4, lines 35-41).

Appellant's argument that no extrinsic evidence or concrete evidence by submission of affidavit is provided in support of the proffered basis to combine the applied art has been fully considered but is not found persuasive essentially for the reasons of record and response to arguments set forth in "Claim 1" section above.

As set forth above and in the previous Final Office Action dated September 3, 2008 (see item 7), Oyama et al. teaches a device (quartz

crystal microbalance, QCM) comprising a sensor element (having biomolecular binding sites for a biomolecule, see entire document, particularly Abstract and Fig. 1) connected to an external oscillating circuit adapted to resonate with the frequency inherent in the quartz plates (column 1, line 64-column 2, line 3) as set forth in the Final Office Action dated September 3, 2008 (see item 7). However, Oyama et al. fails to teach a device comprising a remote power transmission element for receiving a resonant frequency. Oyama et al. further fails to teach a device, wherein a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit is separate from the remote power transmission element, which comprises a coil for receiving RF power whereby the remote power transmission element is arranged for receiving an RF frequency different from the resonant frequency. Further, it is noted that the teachings of Oyama et al. reference have not been traversed.

As set forth above, Ruile et al. teaches a radio-interrogated surface wave technology sensor (see entire document, particularly Abstract), wherein a radiofrequency (RF) transmitter and receiver having transmission and reception antennas, with an electronic evaluation device (circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit), which is used for qualitative/quantitative evaluation of a change in the response of the

surface-wave sensor and for receiving power transmitted from a remote RF transmitter (column 2, lines 30-50) and Ishikawa et al. teaches a wireless power transmitting element (external control station) for transmitting power to another wireless power transmitting element in a circuit provided in a biosensor device (see entire document, particularly p15, lines 3-17 and Fig. 11). The power is transported either by radiofrequency (RF) radiation or by magnetic coupling between the control system antenna/coil and the biosensor antenna/coil (p15, lines 5-17). Using the RF transmissions, the biosensor can be interrogated individually, or as groups (p14, line 27-p15, line 1).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. with a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit as taught by Ruile et al. in order to provide a remote power source and interrogation device for DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency.

The advantage of transmitting and receiving detection signals (resonance frequency of the sensor element) remotely provides the motivation to employ the remote RF transmitter and receiver device of

Ruile et al. in the device of Oyama et al. with a reasonable expectation of success as the remote RF transmitter and receiver device of Ruile et al. can be used in devices comprising different types of sensor elements including a SAW resonator, which is used in biosensor applications to identify or quantitatively measure chemical/biological substances. The remote transmitting and receiving system of Ruile et al. provides advantage over the detection system of Oyama et al. (which is electrically connected to the sensor as depicted in Fig. 9A and column 12, lines 7-17) because the signals generated by the sensor elements can be detected remotely and therefore eliminates the need for electrically connecting each biosensor with detection elements. There is no need to provide extrinsic evidence to support the proffered basis to combine the applied art since the use of remote detection system itself as taught by Ruile et al. is an advantage for variety of sensor devices (column 1, line 51-column 2, line 64) in order to detect signals generated from the sensor devices.

In addition to rationale for combining teachings of Oyama et al. and Ruile et al. set forth above, additional rationales that may support a conclusion of obviousness have been set forth in the "Claim 1" section above. See MPEP § 2143, *KSR International Co. v. Teleflex Inc.* 82 USPQ2d 1385 (2007), and the Examination Guidelines set forth in the Federal Register (Vol. 72, No. 195, October 10, 2007).

2) Claim 2 is Patentable over Oyama et al., Ruile et al., Ishikawa et al., and Hirt

Appellant's arguments in the brief on appeal have been fully considered but they are not persuasive essentially for the reasons of record and response to arguments set forth in section **(1) Claims 1, 3, 4, 5, and 8 are Patentable over the Applied Prior Art** above.

3) Claims 6 and 7 are Patentable over Oyama et al., Ruile et al., Ishikawa et al., and Hardman et al.

Appellant's arguments in the brief on appeal have been fully considered but they are not persuasive essentially for the reasons of record and response to arguments set forth in section **1) Claims 1, 3, 4, 5, and 8 are Patentable over the Applied Prior Art** above.

Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Appellant's arguments have not been found persuasive.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Unsu Jung/

Unsu Jung

Primary Examiner

Technology Center 1600

Art Unit 1641

Conferees:

/Mark L. Shibuya/
Supervisory Patent Examiner, Art Unit 1641

Larry Helms, SPE

/Larry R. Helms/
Supervisory Patent Examiner, Art Unit 1643